A Preservative Tendency in Pre-School Children

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A PERSEVERATIVE TENDENCY IN PRE-SCHOOL CHILDREN

A Study in Personality Differences

BY

HAZEL MORTON CUSHING, Ph.D.

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6 Feb 1932

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A Perseverative Tendency in Pre-School Children

I. INTRODUCTION

Deserving of especial emphasis among the dominant motives in contemporary psychological research, are the quest for fundamental differentiating factors among individuals, and the fertile possibilities of establishing a sound basic psychology through the employment of young children as subjects in scientific investigations.

Additional impetus, in the former case, has been derived from the statistical formulations set forth by Spearman,[27] and somewhat further elaborated by Kelley,[20] whereby various formulae are available for division of traits into demonstrable general, group, and specific factors.

That the advocates of the genetic approach to psychology have not been idle is evidenced by the work of Koffka,[21] Bühler,[7] Claparède,[8] and the Sterns[28] abroad, and by J. B. Watson[37-40] in this country. The field of psychometrics has been extended downward to include the whole period from birth to six years, through the standardizations of normative behavior proposed by Kuhlmann,[22] Gesell,[14, 15] Goodenough,[16] Baldwin,[3] Woolley[45] and Stutsman.[29] Research institutes for the study of pre-school children in this country have been established in connection with many universities, notably at Columbia, Yale, Johns Hopkins, Iowa, Minnesota, and California. The outgrowth of work done in these laboratories is demonstrated by the constantly increasing number of experimental studies embracing various aspects of the child in his relation to the environment. The Twenty-Eighth Year Book of the National Society for the Study of Education[34] lists an extensive array of extant studies as well as topics under investigation. It is becoming well nigh axiomatic that a comprehensive and adequate adult psychology rests upon a fundamental acquaintance with the developmental sequences of childhood.

II Background of the Problem

In the present study an attempt is made to substantiate the validity of the foregoing contentions in regard to the importance of studying differentiating characteristics of behavior at the early age levels. The effort has been made to uncover evidence for or against a basic personality difference in naïve and ingenuous subjects between the chronological ages of two and five.

Observation of the activities of young children yields rich rewards in the way of opening up the need for the solution of many puzzling problems. It has been noted, for instance, that there is a vast amount of difference in the duration of the period of time during which individual children tend to remain engrossed in any particular occupation. It was felt that it might be worth while to determine whether a general dispositional tendency is concerned in such activity, or whether the behavior noted is a function of the material involved, that is, exhibited in varying degrees from toy to toy, or from one occupation to another. If a certain consistency in the behavior pattern were to be disclosed, there might justifiably be postulated a hypothetical innate perseverative tendency, that is, a certain drive of the organism toward continuous activity of an organic pattern once aroused.

In using the phrase 'perseverative tendency,' the investigator is conscious of the possibilities of ambiguity of interpretation. It will perhaps be of value at this point to trace the development of the concept.*

The earliest reference, in the literature devoted to normal psychology, occurs in the memory study of Müller and Pilzecher[25] in 1900. Borrowing the term from current psychiatric usage, they applied it to the spontaneous recurrence in consciousness of nonsense syllables which had been memorized.

Broadening the concept of the term to include the phenomenon of sensory lag or after effect, Wiersma[43] gave tests of color fusion, visual adaptation to darkness, and cutaneous stimulations with electric currents of differing strengths, to one group of normal subjects and two groups of pathological subjects. He found the scores progressively higher in the order of maniacs, normals, melancholiacs.

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* For a more comprehensive account of the historical development and theoretical implications of "perseveration" as a trait, the reader is referred to the discussion in Spearman, The Abilities of Man (27).

The term was still further extended in another direction. In addition to testing the after, or 'secondary' function of Wiersma, two later investigators, Heymans and Brugmans[17] also attempted to measure perseveration through the interference of one function with an analogous one immediately following. Their tests gave an average intercorrelation of .28, while pooled, they correlated only .14 with certain measures of intelligence.

Foster,[10] rejecting the concept of perseveration as a violation of the law of parsimony, interpreted the results of certain verbal experiments on a small number of subjects, in terms of unnoticed motives to association, possibly even of a kinaesthetic or organic nature.

The most extensive investigations on the topic are attributable to Spearman[27] and his students, among whom should be mentioned particularly Wynn Jones,[19] Lankes[23] and Bernstein.[5] The majority of tests employed by these three investigators attempted a measure of the interference of a successive function with a similar one immediately preceding it. In addition, Lankes also incorporated in his series of tests natural rate of tapping, fusion of color discs, and a word association test. Thus in the battery used by him all previously accepted formulations of the term perseveration are represented, including the phenomena of sensory lag, spontaneous recurrence of ideas, and unconscious interference effects.

The acceptance of interference effects as a measure of innate neural lag or inertia, would appear to offer certain pitfalls for the unwary. In a recent study on 'Mental Set and Shift' Jersild[18] found that ability to shift from one operation to another was closely related to skill in performing the separate tasks. It seems probable that the more intelligent the individual, the more easily in general he substitutes one operation for another. Hence a valid study of a perseverative trait should rule out all possible effects of mental ability.

In spite of low intercorrelations among the tests and admittedly poor reliability, Spearman,[27] Ch. XVII, believes the statistical evidence overwhelmingly weighted in favor of a factor common to all the tests. The findings of the English school are further interpreted to indicate that the trait under discussion is unrelated either to speed (Bernstein,[5]), or to volitional control, the W factor of Webb[41] (Cf. Lankes,[23]). Garnett[13] suggests that perserveration is the obverse of the trait of cleverness.

In this country Downey[9] came to the conclusion that the 'disguised handwriting' test (No. 8) in her series of situations designed to measure 'will-temperament' probably taps a real perseverative tendency. According to Dr. Downey it measures a "native tendency to 'keep on working,' psychic momentum, rather than perseverance or sticking at a task until the end is achieved."

Experimental studies on nursery school children have yielded evidence of perseverating behavior. Wagoner[35] notes a marked tendency in some of her subjects for a "process to repeat itself rather than to be shifted to a different one."

In an experimental situation involving a choice of boxes, Marston[24] found that some children invariably responded with the same choice, right or left, showing no hesitation even after consecutive failures.

Reynolds[26] finds that there is a general tendency for individual children to take a similar amount of time to come into rapport in each of three situations.

It is thus readily apparent that the term perseveration, although itself peculiar to scientific terminology, is rather too broad and elastic in its implications to admit of consistent scientific interpretation.

The definition of 'perseverative tendency' for purposes of this study is simply the tendency of an individual to continue in a given mode of behavior when external pressure for continuance, insofar as is possible, has been reduced to a minimum. The conditions implied in such a definition are the absence of an ultimate goal set either by the examiner, or by the nature of the material itself. The remaining drive would presumably be indicative of a certain internal momentum alone. Such an application of the term seems most nearly akin to the explanation offered above by Downey.[9] (p. 5.)

Summary

Perseveration has been conceived of in a general way as the inertia or lag of certain chemico-neural processes. At least three and possibly four specific lines of attack on the trait appear in experimental work, centering about (1) the tendency of ideas to spontaneous recurrence, (2) sensory lag or after effect, (3) interference effects of preceding mental processes with those following, (4) the tendency to continue working at a task when there is no objectively defined end.

A review of previous work suggests two criticisms, first, that the influence of mental ability has not been satisfactorily accounted for, and second, that the linkage between the disparate types of tests employed in a single battery has not sufficiently indicated the relationship between the several concepts.

The definition of perseverative tendency formulated for purposes of this study is simply an individual's tendency to continue in a given mode of behavior when external pressure toward goal seeking has been reduced to a minimum.

III. EXPERIMENTAL STUDY

In conformance with the definition of 'perseverative tendency' selected as a basis for procedure, six different experimental situations were set up. Scoring was done in units of the duration of time during which the individual child remained absorbed in the allotted occupation.

Subjects

The subjects used in the main part of the study consisted of 70 children, ranging in chronological age from 23 months to 60 months. Thirty-nine of the children tested were from the nursery school groups at the Institute of Child Welfare Research of Columbia University, 16 of whom were tested during the spring session, the remaining 23 forming a part of the summer school group; 10 subjects were in the nursery school at Vassar College; Greenwich House Nursery School furnished seven cases, Bethlehem Nursery School, six, and Manhattanville Nursery School, eight. The subjects are therefore roughly divided into two groups, those attending nursery schools connected with an institution of higher learning, and those in schools conducted in connection with a settlement house or day nursery. Assuming a difference in socio-economic background on the basis of this division (although the cleavage is by no means absolute) enables us to make a comparison between the groups in treating the data.

It seemed advisable to restrict the age range to the 2, 3, and 4-year levels, because of the nature of the materials used. In trying out certain of the tests with children younger than 2 and older than 5 it was found that the material was not universally appealing to the same degree that it appeared to be with subjects between these ages. In one or two instances, however, children slightly beyond these arbitrarily imposed limits were unwittingly examined, and these few exceptional cases were not thrown out in considering the results, since their reaction to the test situations seemed quite comparable to that of the others.

Preliminary Procedure

Experimental and educational literature on the young child were searched as a basis for the selection of materials and activities within the scope and interest of children of these age levels. Toy shops, school supply houses, game and toy departments of large merchandising establishments were visited. In setting up tentative situations designed to test out the children's reactions, it was of paramount importance to choose only the sort of material which had a strong intrinsic appeal, since the conditions of the experiment demanded that no conscious goal should be set, either by the examiner, or by the nature of the situation itself. The procedure should, if possible, be self-initiating, and self-perpetuating. These ideals were probably not fully attained in all respects, as will be pointed out later, although there was a fair degree of approximation to the standard set up. Many activities were discovered which possess a strong functional appeal for little children, apart from any meaning inherent in the material itself. Punching holes, stringing beads, dropping small objects one by one into a container, sorting cards, shoveling sand, weaving, swinging, and many other similar activities, furnish examples of occupations which seem in themselves to be inherently satisfying to the child.

An extremely difficult feature in the selection of the material arose from the necessity of meeting the interests of children of widely different stages of development, both physical and mental, yet, at the same time, keeping it well within the limits of the ability of the youngest members of the group. Many more than the desired number of situations were set up tentatively. Of these several of the most promising were tried out on a group of children in the nursery school conducted at the Manhattanville Day Nursery. The majority of the tests elicited ready responses and spontaneous participation on the part of the children. A verbal test, and a motor test originally included were among those discarded from consideration, due to the large number of troublesome constituent factors entering into the performance which were beyond the control of the examiner in a miscellaneous group of this sort, such as, for instance, the degree of verbal consciousness of the child, social inhibitions in a game involving the examiner, and in the motor test, differences in fatigability which were difficult to equate. The final decision was to keep all of the situations within the range of manipulative activity, varying the materials and type of occupation as much as possible.

Materials and Procedure of the Main Study

The following situations were found to satisfy approximately the conditions of the proposed research:

Situation 1: Dropping Marbles through a Hole into a Box

A cardboard box 10 inches long, 7 inches wide, and 3 inches deep was placed on the table before the chair to be occupied by the subject. In the center of the cover was a round hole just large enough to permit one marble at a time to be dropped into the box. Adjoining this box, and directly in front of it was a circular tin box, covered with black enamel, 8 inches in diameter and 3 inches deep, which was filled to the brim with ordinary small cement marbles of uniform size. The procedure was simple in the extreme.

Procedure

After seating S comfortably in the chair nearest the box, E sat down opposite him and said simply, "See how we do this," at the same time picking up a marble and dropping it into the hole. After a repetition or two, she said coaxingly, "Now you do it." Oftentimes, and indeed for the most part, the child needed no invitation, but had already reached for the marble in his eagerness. In fact, the activity frequently got under way before he was fairly seated when E had as yet given no indication of what was expected of him. If he seemed reluctant to touch the material (children of this age are often exceedingly inhibited in the presence of an adult) E placed a marble in his hand, repeating her request, and, if necessary, continuing to demonstrate the process. This proceeding was continued until the child had dropped in six marbles consecutively without urging, except that for the first 60 seconds E said as each one dropped through the hole, "There it goes!" a sort of verbal encouragement which rendered the situation less constrained and artificial at first, and further served to get the activity well under way. It will be remembered that the tin containing the marbles was placed directly in front of the subject, but separated from him by the interposition of the empty box. The reason for this was to ascertain, if possible, the preferred hand. If the child reached with his right hand, as was usually the case, the box of marbles was shifted to his right, to reduce the inconvenience and strain attendant on reaching over the rather sizeable box before him. If, however, he seemed to show an initial preference for the left hand, the box was placed at his left. After the verbal formula, which was continued for 60 seconds, or one full minute, E withdrew from the situation, and apparently became engrossed in her writing, paying no further heed to the subject, unless a direct question was addressed to her, in which case she looked up, and smiled encouragingly, or gave a brief but non-committal reply if the occasion demanded some sort of response. (To have ignored the child's social advances entirely would have conjured up a sense of frustration and hostility toward the examiner which would have speedily dissolved the situation so far as some of the children were concerned. The only safe principle to establish seemed to be that the examiner should not inject herself into the situation either by watching the child openly, or initiating conversation; on the other hand she should respond briefly but in a perfectly natural manner if he insisted upon including her in the general situation. This attitude was maintained throughout the testing situations).

Scoring

The stop watch was snapped at the moment when the activity "got under way," i.e., when six marbles had been placed in the box by the child on his own initiative. The determination of the duration of the perseverative impulse rested upon certain arbitrarily imposed conditions.*

In addition to the measurement of time spent in the activity, the number of marbles deposited in the box was noted, and also a running comment on the behavior and speech of the subject during the test was recorded, the latter being taken as nearly verbatim as possible. (At times the verbal outpouring was so rapid that only brief characteristic snatches could be recorded).

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* See page 22 for explanation.

Situation 2: The Lock and Key Situation

E produced a small padlock and key from the pocket of her smock. Saying, "See how this goes in here," she fitted the key into the lock and turned it, causing the lock to spring open. She then handed both lock and key to S with the request, "You do it." The key slipped in easily and the task was usually accomplished without difficulty by the majority of the children even at the lower age levels. If small fingers were not strong enough to give the final turn, E contributed the additional pressure necessary. After a word of praise at the successful accomplishment, the lock was immediately returned to E's pocket and a larger one was produced, having a more complicated keyhole with a key somewhat bent at the tip. To make sure that no amount of time spent by the subject could insure the successful solution of the lock, a duplicate key was provided which had been slightly 'doctored' in such a way that no amount of manoeuvering would suffice to fit it into the lock. The exchange of keys was accomplished by a bit of legerdemain on the part of E who frankly practiced this deception so that a true measure of the tendency of the subject to 'stay with' the material might be obtained. (This test was tried out with graduate students, all of whom worked patiently for many minutes without suspecting the trickery which had been practiced upon them). The same procedure as that used with padlock 1 was followed except that E, while demonstrating the opening of the lock, held the second key concealed in the palm of her hand, substituting it in place of the right key as she handed it over to the child. The stop watch was started the moment S started to work on the lock, and E paid no further attention to the subject, but busied herself writing as in the previous test. If S handed back the material, saying "I can't do it," or ceased trying for 15 seconds, appearing to 'give up,' E said encouragingly, "I think you can do it, Billy, try once more," and placed the lock and key in S's hands in the proper position. The urging was resorted to only once.

Scoring

Time was kept separately for the two periods, that is, before urging, and after urging. Method, behavior, general attitude, and speech were carefully noted down, as indeed they were throughout all of the experimental situations.

Situation 3: Presentation of Auditory Stimuli

The materials for test 3 consisted of four different stimuli in which the auditory appeal was preeminent: (1) An electric bell, operated by one dry cell, the bell button being screwed to the top of a circular board about one inch in thickness and 10 inches in diameter and the bell itself left unattached so that it might be disposed of somewhere outside the subject's sight and reach, if possible (usually it was placed in a closet and the door closed, or behind a screen, or in one instance it was put in a box on a high window ledge. It is interesting to note that children of these age levels, although frequently curious as to where the sound of the bell came from,—some few of them localized it with a fair degree of accuracy—nevertheless, never appeared to think of tracing the bell to its source by following the wires which led from the board and battery to the bell); (2) a whistle doll of red rubber, representing a small boy dressed in a Russian suit with cap, shoes, socks, belt, and tie, who whistled beautifully in response to pressure on any part of his anatomy; (3) a small nickel-plated handbell; (4) an ordinary 'snapper,' such as is used in the Kuhlmann baby tests.

Procedure

The subject was brought into the room and seated at the small table on which was placed the board containing the push button. E, having seated herself in the small chair opposite S, reached over and pressed the button, saying "See what I can do, can you do it?" Immediately on hearing the bell ring the majority of the children were most anxious to produce the same result, and in many instances a child, recognizing the nature of the material almost before E had settled him in comfort, would make the response without any demonstration or request on the part of E. If he hesitated to repeat the response (to most youngsters even at these tender years, indulging in promiscuous bell ringing is well recognized as one of the forbidden and accordingly fascinating pleasures of organized social life), and it was apparent that such hesitancy was due to strong social training, E said encouragingly, "You may play with the bell if you would like to," a formula which invariably brought the desired activity into play. Occasionally to the older children E explained that it was only a 'play' bell, and did not really disturb anybody, since many of them asked who was being called, what it 'meant,' and if it were a telephone.

The duration of the activity within the limits of the criterion was recorded together with the total number of times the bell was rung.

The electric bell was then moved to one side of the table, out of easy reach of the subject, and E remarked, "Would you like to see something else?" Regardless of whether the child responded or not, the rubber whistle doll was next produced from a nearby place of concealment. E squeezed it several times with the comment, "See what he does, can you make him squeal?" and then passed it over to S who was free to react as long as he wished. The two remaining stimuli, i.e., the bell and the snapper, were presented successively in the same manner as 1 and 2, the discarded toy being laid to one side each time with those that had preceded it. The form for presenting the handbell was, "What is this?" If S did not answer E said, "A bell," and with the words, "How do we ring it?" proceeded to illustrate. She then handed it to S and if he appeared hesitant, said coaxingly, "Ring the bell."

In offering the snapper, the formula was, "See this little slipper—see what it does." After snapping it two or three times, E presented it to the child. Several of the younger children experienced difficulty at first in producing the snapping sound, but soon acquired the knack, with a little help from the experimenter.

After all four of the stimuli had been employed, they were placed together in front of the child, and he was allowed to go from one to the other in any fashion that he saw fit, using them singly or simultaneously distributing his attention in accordance with his interests.

Scoring

Time was recorded for each stimulus separately, as well as the amount of time spent with the material collectively. A total score was obtained by adding these five discrete measures.

Situation 4: Nest of Boxes

A nest of five cylindrical boxes, with covers, furnished the material for this test. The outside box, which alone was visible to the child upon entering the situation, was slightly over 2 inches in diameter, and about 3 inches in height. The surface was beautifully finished, highly polished and of a brilliant cerise color. The enclosed boxes were progressively red, green, yellow, red, and yellow. The last and smallest box contained within it a tiny wooden disc, stained cerise.

Procedure

The directions were simply, "Here's something for you to play with." In picking up the box from the table, the child invariably caught the telltale rattle of the boxes within, and proceeded to investigate the material further. In any case, further manipulation usually resulted in the removal of the cover of the outside box and the subsequent revelation of the 'surprises' within. E usually said conversationally, "What are those?," and if no reply were made indicating that the child had no label for the articles, said "boxes," and then asked S if he could say "boxes". This served to initiate the situation on an informal basis, while at the same time nothing in particular was demanded of the child, nor was any indication given that he was expected to replace the material as he had found it. As a matter of fact, a performance of this kind is beyond the scope of many of the children used in this study, and to them the boxes disclosed were merely manipulative or play material.

Scoring

It was of interest, however, to record not only the total time spent in manipulating the material, but also the number of times the set was completely and correctly assembled, the time for the initial performance of this sort, various projects that appeared and other descriptive data relating to the child's activities with the boxes.

Situation 5: Visual

A stimulus was sought for test 5 which should be of a predominantly visual sort. The ideal would have been a series of alternating electric signs, such as are used in advertising display. Such a set-up outside of the psychological laboratory is highly impracticable, however, as well as prohibitive from the standpoint of expense. An inexpensive semi-mechanical toy was finally found which seemed to have a strong visual element and which was quite analogous to the other materials presented to the children in this study. A small lever, operated by hand, set in motion a series of cog wheels which in turn set in motion the surface disc. This in turn passed over two bits of a hard substance and the friction thus created threw off innumerable 'stars.' Strips of red and blue isin-glass gave the illusion of red, white and blue 'stars'.

Procedure and Scoring

The procedure was as follows. E asked S if he had ever seen any stars up in the sky. She then asked him if he would like to see some stars. Producing the 'star machine' from the convenient smock pocket, she told S to watch closely and he would see the stars. The machine was started and the watch was snapped simultaneously. As soon as the child indicated that he would like to make some 'stars', the watch was snapped again and the time read. Many of the children asked permission verbally, others merely reached for the toy. In the very rare cases where the child lost interest in watching the stream of tiny sparks, E made the suggestion that he should try it himself. The watch was snapped again and the duration of the impulse was recorded as usual.

Situation 6: Motor Toys

Three toys fastened on wooden bases three-fourths of an inch in thickness were clamped onto three sides of the small table, at the maximum distance apart. The toys had been selected to fulfill four conditions: (1) they should be comparable in intricacy and general appeal, (2) they must all 'perform,' yet in such a way that they could be clamped onto the table, (3) they should be within the child's range of manipulative ability, (4) they should be fairly durable, that is, capable of resisting the onslaughts of healthy youngsters of two, three, and four years of age, who as yet have little insight into delicate manipulations or the relative 'breakableness' of different sorts of materials.

Toy departments and shops were scoured for toys which answered to this description. Electric toys, mechanical toys winding with a key, toys on wheels, though present in great variety and abundance, had to be rejected as unsuitable from the standpoint of the criteria set up. Finally three were found that possessed suitable qualifications as 'experimental apparatus': (1) three race horses that dash madly around a circular track, operated by a thumb screw; (2) four tiny airplanes which when pushed to the top of a spiral pole came careening down around the pole at a fairly rapid rate; (3) a see-saw, with a small figure of a boy and a girl set on the ends; when the wire in the center is pulled up the see-saw continues in motion automatically until the wire has again disappeared. All of the children in the study were able to operate the toys after one or two trials.

Procedure

The procedure consisted simply in leading the child into the testing room where the toys were set up as just described. E said, "Here are some toys for you to play with. See what this one does." E then proceeded to illustrate each toy, letting the child 'work' it once, before passing on to the next toy. After the third toy had been put through its paces successfully, the experimenter retired with her writing materials to a chair at some distance from the table, yet where she could easily observe the situation, first, however, giving the child the necessary permission to 'play with the materials'. (The formula was simply, "You may play with them a while if you wish.") In order to equalize the chances of response to the different toys as much as possible the chair formerly used by the subject had been removed from the room.

Scoring

Total time spent in the situation, the time spent with each toy, and number of shifts from toy to toy were recorded.

Conditions of the Experiment

Throughout all of the experimental situations certain precautions were observed. So far as possible, all extraneous stimuli of a distracting nature were removed from situations. At Columbia and Vassar it was possible to obtain the use of a practically unfurnished experimental room, or 'laboratory.' Both of the rooms used at the Columbia Institute, however, contained a bowl with running water. These were screened off by plain brown screens, so that the amount of visual distraction should be minimized as much as possible. Otherwise the equipment for the testing situations consisted of a small table, and two small chairs of nursery school size, one for the subject and one for the experimenter. Material not in use was kept out of sight for the most part, either in the closet, or in the pocket of E's smock. At the settlement nursery schools a corner of the large sleeping room had to be utilized as a testing laboratory. Plain screens were placed around the space, however, and an approximation to the ideal situation was secured.

In the course of the experiments each child was taken as a rule four different times—if possible at intervals of about a week apart. Situations 1 and 2 (Marbles and Lock and Key) were usually administered during the first sitting, Situation 3 (the Auditory Stimuli) during the second, Situations 4 and 5 (Boxes and Visual) at the third, and Situation 6 (Toys) the fourth and last time. In some cases, however, the order was deviated from, for administrative or practical reasons. There were two factors which made it desirable to take the child at different times, first, that of fatigue—the average time spent in each of the six situations was 14.65 minutes, making a total of 87.9 minutes for each child; the nature of the material would, no doubt, have rendered such an interval boring and fatiguing to most of the children. Secondly, the expectation of material to follow had a tendency to cut across the perseverative impulse. Hence, it was important that the children should not be anticipating a forthcoming toy.

Rapport was established with the child before bringing him to the experimental situation. E went to the roof or playroom, as the case might be, and invited a child to come and play 'games', permission having first been secured from the teacher in charge. In many cases the teacher was helpful in establishing the necessary rapport, especially during the first series, when E was more or less of a stranger to the children. In the case of some of the younger children she often accompanied the young subject a part or all of the way to the laboratory, since it was essential for the success of these particular tests that the subject should come in a spirit of full cooperation. If the child were busily engaged in some absorbing occupation, or if he were extremely resistant to the notion of accompanying E at a certain time, the matter was dropped and he was asked at a later time, since by experience it was found that such cases tended not to settle down comfortably to the activity in hand. On the whole, however, very little resistance was encountered; especially after the first visit many of the children were eager to play games with E and would often volunteer for successive visits.

Scoring

Scores for all of the tests were kept in terms of time, and in the case of Situation 1, the number of marbles used was also recorded. A stop watch was used which registered in hundredths of a minute. It must be clearly understood that exact records of time consumed in reacting to situations of this type are practically impossible. There is a large variable error, and the only advantage of keeping the records in terms of such fine units was the subsequent ease of treating the data, since hundredths of a minute are more easily handled statistically than 'seconds'. Reynolds[26] sums up the difficulties in timing young children well in the following passage: "Further, it must not be expected that the timing was comparable in accuracy with that of the laboratory experiments with which most students of psychology are familiar. Instead of being done in tenths or hundredths of a second, in only a few unusual cases was an interval of less than five seconds deemed significant. The method of timing, it will be remembered, was that the examiner noted the time by glancing at the moving hand of the stop watch, so that errors of a few seconds each way were probably frequent. Furthermore, in dealing with small children, the natural slowness of their movements makes it unnecessary to attempt too great precision for experiments of this kind. An error of a few seconds is not of significance when the total time is relatively large."

Criterion of Perseveration

The length of the perseverative impulse had of necessity to be determined somewhat arbitrarily. Occasionally, the child himself put an end to the activity by rising with the statement that he had 'finished', or he started out of the room stating that he was ready to go back to the roof or playroom. In such cases E made no effort to detain him, nor did she refer to the material in any way, but merely said quietly, "All right," at the same time strictly observing the passage of the hand of the stop watch. It often happened that in spite of a declaration of this sort the child returned to the material of his own accord in a few seconds, and the activity proceeded as before. If, however, 60 seconds or a full minute elapsed during which there was no further indication of a response to the material, time was called and the impulse was considered as having run its course. There were some children who were unable to take this simple and direct way out of the difficulty, and it might be argued at first sight that the feeling of social pressure, the expectation that the examiner would end the situation when the proper time arrived, the unwillingness to offend the 'lady' by an abrupt departure, might serve to keep these subjects at the activity indefinitely. On the contrary side, it must be borne in mind that E was to all intents and purposes attending strictly to her own affairs; S was therefore free to manipulate the material as he wished or to disregard it entirely if he so chose. This was, in fact, what happened in the majority of cases. Waning interest in the material was usually evidenced by pauses of increasing length during which the critical reaction did not occur, and finally the little subject sat quietly in his chair with his hands at his side, or he might slide down and walk quietly over to the window, or manipulate the material in some way that was distinct from the activity as originally evoked. Whatever the transition, any significant pause was immediately timed, and after a continuous pause of 60 seconds the activity was considered to have practically 'petered' out, so far as the spontaneous interest of the child was concerned.

Summary

The subjects used in this study consisted of 70 children, ranging in C.A. from 23 months to 60 months. Six testing situations were set up, all of a simple repetitive character: (1) dropping marbles through a hole in a pasteboard box; (2) a lock and key situation; (3) presentation of four auditory stimuli; (4) a nest of cylindrical boxes; (5) a visual stimulus; (6) three motor toys. The subject's interest was enlisted (no task was set except in Situation 2) and he was allowed to manipulate the material as long as he saw fit. A criterion of the duration of the impulse was set up and the time spent was taken as the measure of the individual's 'perseverative tendency'.

IV. RESULTS OF THE EXPERIMENT

Original Data

Table I presents the original data for the six experimental situations in terms of minutes to the nearest tenth, the chronological ages of all subjects and, in the case of Group A,* M.A.'s and I.Q.'s derived from Binet[31] records, as well as M.A.'s obtained on a Merrill-Palmer[29] test. The ranges, means, and standard deviations of the distributions are also recorded.

In every case the mental tests were given by an experienced psychologist. With the exception of ten cases in which the Stanford revision[31] was given, the Kuhlmann[22] form of the Binet was used. Wells,[42] (page 88) says, "In general the correspondence of Kuhlmann and Stanford scores is so close as to obviate serious question as to relative reliability of scores. . . . Plant has found nearly identical Kuhlmann and Stanford scores in normal children."

The discrepancy between dates of testing and the experimental situations was obviated by multiplying I.Q. by present C.A., present C.A. being calculated to the mid-point of the experimental period for each child. The result is the required M.A., for the equation $\text{I.Q.} = \frac{\text{M.A.}}{\text{C.A.}}$ resolves to $\text{M.A.} = \text{C.A.} \times \text{I.Q.}$ In all cases the mental tests were administered within a few months of, or coincidentally with, the experiments.

It was not deemed advisable to attempt to secure mental ratings on Group B, since many of the children were of foreign parentage. Furthermore, although I.Q.'s were available for the majority of this group, the tests were administered for the most part by inexperienced student testers, so that it did not seem wise to include the results in the treatment of the data.

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* The children attending the nursery schools at Columbia and Vassar, and those attending settlement nursery schools, will hereafter be designated respectively as Group A and Group B.

TABLE 1

RAW SCORES IN MINUTES TO THE NEAREST TENTH FOR THE SIX EXPERIMENTAL SITUATIONS. C.A., BINET M.A., BINET I.Q., AND MERRILL-PALMER M.A.

Group A			*Situations*								
Case	*Sex*	*C.A. (mos.)*	*Marbles*	*Key*	*Auditory*	*Boxes*	*Visual*	*Toys*	*Binet M.A.*	*Binet I.Q.*	*M. P. M.A.*
1	M	26	22.9	1.5	11.9	21.9	....	10.0	34.3	132	29
2	M	27	9.4	1.0	28.2	9.6	10.9	16.2	29.1	108	23
3	F	27	18.9	0.8	7.3	9.8	5.0	15.3	37.8	140	32
4	F	27	8.2	7.1	6.0	7.1	4.4	15.0	36.7	136	36
5	F	27	18.5	3.8	11.2	22.2	5.8	11.7	28.8	95	35
6	F	29	6.9	3.7	16.6	24.3	12.1	40.3	31.6	109	30
7	M	29	10.0	2.4	16.0	13.8	11.4	27.1	39.4	136	38
8	F	30	16.0	0.9	16.2	16.9	6.8	20.1	51.3	171	42
9	M	30	5.0	1.3	11.4	11.7	10.1	16.5	40.2	134	37
10	F	31	12.5	2.4	8.2	13.4	23.8	7.0	41.2	133	32
11	F	32	15.0	1.2	12.1	18.4	8.8	19.0	43.5	136	30
12	F	33	23.0	2.9	14.7	34.7	....	24.2	46.2	140	35
13	M	33	7.3	0.9	10.8	21.5	12.2	32.0	44.2	134	33
14	F	33	42.1	1.8	13.2	19.0	10.2	18.5	34.5	105	29
15	F	34	39.3	7.9	19.7	17.5	14.3	25.2	39.0	114	37
16	F	35	13.8	2.7	12.8	11.3	9.1	20.1	45.3	131	34
17	M	35	15.8	3.2	9.7	20.8	13.9	20.7	40.5	116	38
18	M	35	19.5	0.7	25.0	25.9	14.5	23.3	43.7	125	38
19	F	35	28.0	1.2	24.5	36.5	6.8	37.3	40.2	115	39
20	M	36	10.8	1.1	11.9	7.0	13.4	30.1	41.4	115	33
21	M	36	11.4	2.1	7.8	8.1	6.0	7.3	32.7	117	28
22	M	37	29.9	4.3	3.5	6.0	0.8	23.6	54.0	146	44
23	F	37	21.5	3.9	12.8	14.0	....	24.0	45.5	123	29
24	F	37	8.3	2.8	11.4	10.7	11.8	9.4	42.5	115	47
25	F	38	4.0	2.7	8.0	31.2	8.9	8.0	49.0	129	44
26	M	38	28.1	3.4	8.0	11.7	3.7	5.7	44.5	117	41
27	F	38	27.3	2.5	20.4	30.8	7.3	21.0	54.7	144	52
28	M	39	8.4	1.2	35.1	14.8	9.1	37.4	36.2	93	38

TABLE 1 (Continued)

RAW SCORES IN MINUTES TO THE NEAREST TENTH FOR THE SIX EXPERIMENTAL SITUATIONS. C.A., BINET M.A., BINET I.Q., AND MERRILL-PALMER M.A.

Group A			*Situations*								
Case	*Sex*	*C.A. (mos.)*	*Marbles*	*Key*	*Auditory*	*Boxes*	*Visual*	*Toys*	*Binet M.A.*	*Binet I.Q.*	*M. P. M.A.*
29	M	39	19.0	1.9	5.0	11.1	2.5	12.0	42.1	108	35
30	M	39	7.0	2.8	17.2	16.6	12.0	28.0	52.5	135	47
31	F	41	48.8	14.5	33.2	28.0	15.5	36.0	59.0	144	54
32	M	42	19.5	8.9	29.8	19.3	24.2	60.7	50.4	120	40
33	M	42	20.5	0.9	24.0	17.7	15.1	24.5	36.0	86	37
34	F	43	8.0	2.6	10.1	7.0	10.0	12.0	56.3	131	47
35	M	43	20.4	3.2	15.9	3.8	7.8	21.5	61.5	141	55
36	F	44	44.5	1.5	30.2	36.3	....	34.3	58.0	132	50
37	F	44	9.6	1.4	7.1	18.8	6.3	11.6	60.0	136	48
38	F	46	50.0	3.4	15.2	32.9	....	39.6	53.3	116	46
39	M	46	8.7	1.7	10.6	5.4	3.1	12.3	59.3	129	49
40	F	46	60.9	3.6	21.2	46.0	13.0	47.5	63.0	138	52
41	M	47	8.1	2.0	28.2	12.0	12.6	15.5	75.6	161	61
42	F	48	3.3	1.3	10.3	18.5	4.6	5.0	45.6	95	41
43	M	49	21.0	3.1	12.6	23.5	....	19.1	59.2	121	54
44	F	49	10.0	2.4	4.3	8.0	5.9	20.9	52.9	108	49
45	F	50	25.2	3.4	7.9	33.0	6.0	17.1	73.5	147	67
46	M	53	36.5	1.5	32.1	13.8	6.7	30.8	64.6	122	56
47	M	54	26.1	5.0	7.4	11.6	9.0	18.8	65.3	121	56
48	F	57	12.0	1.5	9.0	6.0	3.1	14.3	60.9	107	35
49	F	61	31.0	14.0	22.2	7.9	4.0	22.0	92.1	151	78
Group B											
50	F	23	15.0	....	19.4	37.0	....	9.5	....	...	..
51	M	30	35.1	....	20.5	16.8	16.6	20.2	....	...	..
52	M	31	11.9	1.7	14.7	9.7	6.8	19.2	....	...	..
53	M	31	16.9	4.7	17.1	5.7	5.2	15.2	....	...	..
54	F	35	9.0	5.0	10.1	7.4	6.2	10.0	....	...	..

TABLE 1 (Continued)

RAW SCORES IN MINUTES TO THE NEAREST TENTH FOR THE SIX EXPERIMENTAL SITUATIONS. C.A., BINET M.A., BINET I.Q., AND MERRILL-PALMER M.A.

Group B			*Situations*								
Case	*Sex*	*C.A. (mos.)*	*Marbles*	*Key*	*Auditory*	*Boxes*	*Visual*	*Toys*	*Binet M.A.*	*Binet I.Q.*	*M. P. M.A.*
55	M	36	14.5	2.1	16.2	21.8	9.2	13.1	....	...	..
56	F	39	7.1	0.8	8.1	13.0	16.0	17.9	....	...	..
57	M	39	9.6	13.7	12.5	4.9	3.1	15.3	....	...	..
58	F	41	22.0	0.5	7.1	30.0	....	2.3	....	...	..
59	M	41	30.7	1.3	41.6	26.0	16.5	36.5	....	...	..
60	F	42	24.0	2.7	6.2	19.9	2.8	25.2	....	...	..
61	M	42	16.6	2.2	17.8	27.7	11.1	19.0	....	...	..
62	M	42	28.3	1.4	24.3	26.4	23.0	21.0	....	...	..
63	F	43	8.2	1.9	8.4	5.8	4.0	7.3	....	...	..
64	F	43	6.0	2.0	9.4	13.3	8.6	11.1	....	...	..
65	F	48	11.0	4.0	12.8	7.2	6.4	6.3	....	...	..
66	F	49	38.2	3.1	17.6	17.3	14.5	34.2	....	...	..
67	M	51	28.2	1.7	13.0	17.2	10.9	22.0	....	...	..
68	F	52	14.9	3.0	11.7	11.7	5.3	16.0	....	...	..
69	F	54	40.8	14.6	31.2	34.0	6.9	30.0	....	...	..
70	F	60	33.4	5.0	37.8	32.2	12.0	31.1	....	...	..
Range		23-61	3.3—60.9	0.5—14.6	3.5—41.6	3.8—46.0	0.8—2.4	2.3—60.0	28.8—92.1	86.0—171.0	23.0—78.0
Mean		39.7	20.1	3.3	15.9	17.9	9.6	21.1	49.1	126.5	42.0
S.D. Dist.		10.5	12.6	3.2	8.7	10.0	5.1	11.0	12.8	17.3	5.8

The mean I.Q. of Group A is exceptionally high. The probability is, however, that the inclusion of Group B lowers the average intelligence of the group as a whole to somewhere near normality.

Intercorrelations

Table II shows the intercorrelations of the experimental scores and chronological ages for the complete group (italicized) and duplicates in Roman type the same information for Group A plus the intercorrelations with M.A. and I.Q. It will be seen by inspection that the results on the whole do not vary greatly between the two groups. A low correlation for one group is matched by a low correlation in the other. The fair correlations correspond. The best correlations are the same in both groups. Apparently subtracting the 21 children in Group B does not seriously affect the findings. Inspection of the means and standard deviations for the two groups (Table II) further confirms the similarity of the results. It is accordingly justifiable to apply further statistical procedures to the additional data available concerning Group A.

It will be noted that the Key Situation shows either a slight correlation or a zero correlation with the other scores. This result was rather expected, since the basis of the test was not so much *perseveration* as *persistence in the face of difficulties,* the subject being directed to unlock a padlock with a key which had been 'doctored' so that all possibility of ultimate success was precluded. This test was left in the battery for the purpose of discovering if possible whether persistence and perseveration were one and the same thing. So far as can be judged on the basis of a single test, the answer is negative. The fairly significant correlation of Key with Marbles would seem to be explained by a fact noticed by the investigator throughout the course of the experiment, namely, that for many of the older children, the dropping of the marbles into the box constituted a self-appointed task. They would often say, "I am going to put all these in," setting up at least a temporary goal, which, though it usually faded out with the onset of fatigue, nevertheless prolonged considerably the original impetus.

Omitting the Key test we find that the intercorrelation coefficients of the experimental scores range from .18 ± .08 to

.61 ± .05 with an average inter-r of .42. With the Key test included the average of the intercorrelations drops to .34.

The rather significant relationship between C.A. and the Marbles and Key scores can presumably be explained on the basis mentioned above, namely, that the older children felt the sense of a task imposed in these two situations. For the same reason, Key scores correlate significantly with M.A., while the remaining correlations between Binet M.A. and the single situations yield low coefficients corresponding to those with C. A. In fact, with the exception of Situation 2 (Key) the two arrays of r's with C.A. and M.A. are practically identical. The high correlation (.84) between M.A. and C.A. in this population may serve in part to explain this agreement.

TABLE II

INTERCORRELATIONS, FOR GROUP AS A WHOLE, AND FOR GROUP *A*

N = 70
N = 49

	C.A.	*M.A.*	*I.Q.*	*Marbles (1)*	*Key (2)*	*Auditory (3)*	*Boxes (4)*	*Visual (5)*	*Toys (6)*
C.A.	....								
M.A.	...... .84 ± .03	....							
I.Q.	...... .005 ± .10	....	....						
(1) Marbles	*.28 ± .07* .25 ± .09	...... .26 ± .09	...... .09 ± .10	....					
(2) Key	*.26 ± .08* .25 ± .09	...... .37 ± .08	...... .20 ± .10	*.32 ± .08* .38 ± .09	....				
(3) Auditory	*.17 ± .08* .12 ± .09	...... .13 ± .09	...... —.01 ± .10	*.41 ± .07* .32 ± .09	*.23 ± .08* .22 ± .09	....			
(4) Boxes	*.03 ± .08* —.02 ± .10	...... .03 ± .10	...... —.09 ± .10	*.53 ± .06* .52 ± .07	*.004 ± .08* .006 ± .10	*.38 ± .07* .31 ± .09	....		
(5) Visual	*—.12 ± .08* —.21 ± .10	...... —.19 ± .10	...... —.04 ± .10	*.18 ± .08* .07 ± .10	*—.05 ± .09* .16 ± .10	*.45 ± .07* .42 ± .08	*.33 ± .08* .27 ± .10	....	
(6) Toys	*—.14 ± .08* .08 ± .10	...... .08 ± .10	...... —.001 ± .10	*.50 ± .06* .43 ± .08	*.24 ± .08* .29 ± .09	*.61 ± .05* .61 ± .06	*.37 ± .07* .41 ± .08	*.46 ± .07* .49 ± .08	....

Correlations with Composite

In order to investigate somewhat further the influence of certain factors upon the situations taken as a whole, the Toops multiple ratio formula was employed, using as successive 'criteria' M.A., C.A., weight-height index, number of marbles, and average number of marbles per minute. The method, which has been fully described by previous investigators, (cf. Garfiel;[12] Toops;[33] Allen[1]) has certain advantages over the commonly employed multiple correlation formulae, in that the maximum relationship obtainable with the data is disclosed and in addition the labor of computation is lightened to some degree. No permanent weightings are assigned the separate variables, but each is weighted in combination with the other variables of the group, according to the amount which it contributes to the relationship of the total with the 'criterion'.

The results obtaining from the use of this formula appear in Table III.

TABLE III

Multiple Correlation, R, of Composite with C.A., Weight-Height Index, Number of Marbles, Average Number of Marbles Per Minute, Binet M.A., Binet I.Q., Merrill-Palmer M.A.

N =	*C.A.*	$\frac{W}{H}$	*No. of Marbles*	*Av. No. Marbles Per Min.*	*Binet M.A.*	*Binet I.Q.*	*M. P. M.A.*
70	.39	.31	.88	.28	..	..	..
49	.41	.30	..	..	.48	.25	.58

Implications in the data set forth in Table III can be still further clarified by the application of another technique, that of partial correlation (cf. Garrett[11] page 221 ff.). Although there appears to be a relationship between chronological age and total time spent in the six situations, partialling out M.A. reduces the coefficient to practically zero ($r = .008$). When C.A. is held constant, M.A. correlates with the composite .28. The conclusion is that there is only a slight tendency for the children who are older mentally to attend longer to given stimuli, while there is no indication that chronological age affects the matter appreciably.

To further indicate the influence of M.A. and C.A. upon the results, partials of the second order were resorted to. Table IV presents the original 'raw' correlations of zero order together with the corrected coefficients, to four decimal places for Situations 1, 3, 4, 5 and 6. Situation 2 is omitted because it appears to be characteristically different from the other five variables.

TABLE IV

EFFECT OF PARTIALLING OUT C.A. AND M.A.

	r_{13}	r_{14}	r_{15}	r_{16}	r_{34}	r_{35}	r_{36}	r_{45}	r_{46}	r_{56}
Zero order r	.3224	.5157	.0677	.4341	.3072	.4229	.6018	.2705	.4109	.4914
Second order r (C.A. and M.A. partialled out)	.3018	.5258	.1294	.4291	.3057	.4634	.5983	.2844	.4097	.5225

It is apparent that the change in coefficients is inconsequential. The factor or factors tying the tests together are something apart from M.A. and C.A.

The correlation of Merrill-Palmer M.A. with the composite is high enough to justify a hypothesis as to some sort of interrelationship of function. It is conceivable that interest and skill in manipulation are coordinate to a certain extent. Ability in a performance type of test such as the Merril-Palmer may influence to some degree the length of time a child remains absorbed in stimuli of a manipulative sort.

In order to determine more definitely the influence of ability in performance tests upon the experimental scores, the intercorrelations were again submitted to a correction by partialling out Merrill-Palmer M.A. and C.A. The original r's with the corrected r's are given below.

TABLE IVa

EFFECT OF PARTIALLING OUT C.A. AND M.P. M.A.

	r_{13}	r_{14}	r_{15}	r_{16}	r_{34}	r_{35}	r_{36}	r_{45}	r_{46}	r_{56}
Zero order r	.32	.52	.07	.43	.31	.42	.60	.27	.41	.49
Second order r (C.A. and M.P. M.A. partialled out)	.28	.53	.13	.41	.29	.46	.61	.27	.40	.52

No drastic changes in the value of r are noted for the individual tests when Merrill-Palmer M.A. is partialled out.

The correlation of the series with the weight-height index is not sufficiently high to justify conclusions as to any relationship with anatomical build. Since the ratio of weight to height tends to increase progressively with age (cf. Baldwin[4] Tables pages 255 and 256), it is quite probable that we have the factor of maturity entering the situation here, rather than a true relationship between body build and perseverative tendencies.

It occurred to the investigator that the number of marbles dropped per minute might be a sort of 'natural speed' index or an indication of 'energy' or 'work' level. Whatever the nature of this index, its correlation with the function measured by the situations is of small significance.

Reliability

To ascertain definitely the reliability of an experiment of this sort is difficult if not impossible. Rough estimates only can be formed through indirect evidence.

Each situation was correlated against a composite consisting of the other five situations in the series. Table V gives these coefficients.

TABLE V

Correlation of Each Test Against a Composite Composed of the Other Five Variables

$r_{1.23456} = .67$
$r_{2.13456} = .43$
$r_{3.12456} = .66$
$r_{4.12356} = .60$
$r_{5.12346} = .56$
$r_{6.12345} = .70$

The four 'tests' which appeared to have the highest validity by the foregoing criterion, viz. 1, 3, 4 and 6, were next divided into two pairs or 'teams'. By application of the method of 'reduced scores' suggested by Woodworth,[44] the measures were transformed into comparable units, each score being expressed as a plus or minus deviation from the mean in terms of its own sigma. Sigma scores 1 and 3 (Marbles and Auditory) and sigma scores 4 and 6 (Boxes and Toys) were thus simply added and averaged. The sigmas of the two new distributions are readily found by application of formula 4 (44, page 106), $r = 2\sigma_{s}^{2} - 1$. Multiplying the two sets of sigma scores or deviations from the mean which is taken at zero, and dividing this result by $N\sigma_{x}\sigma_{y}$ we get the desired correlation coefficient which in this case is .71. Applying the Spearman-Brown prophecy formula enables us to say that the four testing situations, when utilized as a team, possess a reliability of about .82.

Method of Tetrad Differences

The final proof of a common factor coextensive throughout any group of situations necessitates the application to the data of Spearman's most recent criterion, that of tetrad differences. The mathematical evolution of the formula and its various derivatives may be found in Spearman,[27] Appendix. (cf. also Walker[36]). Theoretically a tetrad consists of any four correlations which in a given correlation table form a rectangle. Given four such values, as for example r_a, r_p, r_b, r_g, then the resulting tetrad equation (t_{apbg}) reads $r_{ap}\, r_{bg} - r_{bp}\, r_{ag} = 0$ ([27], Appendix, page iii). Allowance for errors of sampling is made by determining the P.E. of the equation ([27], Appendix, page viii ff.). Should the value on the right hand side of the equation approach zero within the limits of its sampling error, the equation is said to be satisfied and proof of divisibility into two factors, 'g' and 's' is established.

Table IV in our data gives the intercorrelation of five variables, Marbles (1), Auditory (3), Boxes (4), Visual (5), Toys (6), corrected for the influence of chronological and mental ages by partialling out these factors [according to Spearman ([27], Appendix, page vi) the criterion itself is freed from the influence of 'attenuation']. The total number of different tetrad differences for n variables is $3nC_4$ ([27], Appendix, page xii). Substituting 5 for n, the number of tetrads involved is 15, with an equal number of the same magnitude but opposite in sign. In Table VI are given the 15 possible values for the tetrads involving our five variables.

TABLE VI

SHOWING THE 15 POSSIBLE TETRAD COEFFICIENTS FOR 5 GIVEN VARIABLES

(1)		*(2)*		*(3)*		*(4)*		*(5)*	
Variables	*t*	*Variables*	*t*	*Variables*	*t*	*Variables*	*t*	*Variables*	*t*
	.2354		.1950		.078		.1110		.0274
1,3,4,5	.0437	1,3,4,6	.0103	1,3,5,6	.0418	1,4,5,6	.0439	3,4,5,6	.0068
	.2035		.1847		.1198		.0671		.0206

One probable error was calculated in each series of three tetrads by substituting in Kelley's formula[20], p. 49, for S.D. and multiplying the obtained value by .6745. The resulting P.E. is approximately ±.05 in each case. Inspection of the tetrad coefficients in the light of their variability suggests the application of Proposition 16 proposed by Kelley: "If the intercorrelations between four variables are such that $t_{1234} = t_{1243}$, and $t_{1342} = 0$, they could conceivably have arisen from four variables x_1, x_2, x_3, x_4, through which was a general factor plus, in addition thereto, a second factor common to x_1 and x_2 or a second factor common to x_3 and x_4," ([20] page 69).

It follows that in Series 1 and 2 of our tetrad differences the conditions are met for a general factor (g) plus specifics (s) plus a 'group factor' due to overlapping of specifics in similar functions. Series 5, which omits the Marbles Situation, seems comparatively free from the influence of overlapping factors. The middle tetrad difference closely approaches zero, the other two, although similar in magnitude, are extremely low so that a group factor, if present, is small in amount. Presumptive evidence would lead to the conclusion that Situation 1 (Marbles) is tied by certain common elements to one other of the test series. Closer inspection reveals empirically that Marbles and Boxes (1 and 4), occurring in the same series, invariably indicate the presence of a large group factor.

To cancel the influence of this hypothetical group factor, 1 and 4 were pooled and their correlation with 3, 5, and 6 calculated by the multiple correlation method (Garrett,[11] page 221ff). Application of the formula used above in determining the possible number of tetrads to be derived indicates that there are but three such combinations. Table VII gives the tetrad values together with the median probable error (Kelley,[20] p. 64).

TABLE VII

TETRAD DIFFERENCES WHERE 1 AND 4 = MARBLES AND BOXES POOLED; 3 = AUDITORY; 5 = VISUAL; 6 = TOYS.

Variables	*t*	*Median P.E.*
1 & 4,3,5,6	.008 .038 .046	±.05

Clearly according to the criterion, the evidence seems to point strongly in the direction of a factor common to all five situations, plus, possibly, certain small group factors. In the case of both the Marbles and Boxes it is quite conceivable that some sort of challenge was presented to the child which was absent in Situations 3, 5, and 6. As to the Marbles Situation, the explanation of a self-assumed task has already been postulated; in the case of the Boxes there was a certain appeal to imaginative play which was less marked in the other situations, that is, the children often engaged in various projects with the material, using it in a fashion similar to building blocks.

Granting a general factor, exclusive of intelligence and chronological age, let us determine to what extent this factor (p) is measured by each situation and by all of the situations combined. Again we can appeal to Spearman for a proposed method for solving this problem, since by formula 19 (^{27}, Appendix, page xvi),

$$r_{ag} = \sqrt{\frac{r_{ab}\, r_{ac}}{r_{bc}}}$$

Schematizing our terms so that

p = the general factor,
a = Marbles and Boxes pooled,
b = Auditory,
c = Visual,
d = Toys,

three possible values can now be found for r_{ap}, r_{bp}, r_{cp}, r_{dp}, respectively. The average of the three values denotes the extent to which each situation contributes to the measurement of p. Table VIII contains the values of the average r's.

TABLE VIII

Average Correlation Coefficients of Variables a, b, c, d, With p.

$r_{ap} = .50$
$r_{bp} = .71$
$r_{cp} = .60$
$r_{dp} = .86$

The Toys Situation appears to be the best measure of our general factor p. It is noteworthy that the tests yielding the lowest correlation with the general factor p, i.e., Marbles (1) and Boxes (4), are those in which a challenge other than immediate satisfaction in manipulation was observed to be present. This appears to reinforce our original premise, that the less favorable a situation was to goal-seeking—apart from mere manipulation of a repetitive sort—the more effective the situation would be for measuring p. The correlation, $R_{p(abcd)}$, of the combined tests with p by means of the multiple R formula proves to be .76. The situations either in combination or singly seem to measure the general factor p to a considerable extent.

Variability Within the Group

In order to show roughly the spread of the trait throughout the group, the average sigma standing on the four tests which were complete for all 70 subjects (Sit. 1, 3, 4, 6) was computed.

Figure 1 represents the distribution of average sigma scores which range from —1.20 sigma to +2.20 sigma. A more accurate method of showing the variation in the amount of the factor present in the different individuals would have been the calculations of total p scores for each subject according to Formula 31 given in Appendix, p. xx, by Spearman. Such refinement of method was not considered to be worth the extra labor involved in the present study.

The spread of over 3 sigmas in total scores indicates that considerable individual consistency must be present in the group as a whole. The variability of each individual was further checked by computing the mean square deviations, σ, of his standing in the four tests. These individual standard deviations range from .02 to 1.26, showing that there are marked individual differences in the consistency shown by different subjects.

Summary

Intercorrelations between the six experimental situations averaged .34. The Key test, which involved the element of persistence in the face of difficulty rather than a pure perseverative tendency, alone failed to give a positive correlation with all of the other situations. It also showed a significantly higher correlation with M.A. and C.A. than any of the other variables. When it is omitted from consideration the average of the intercorrelations rises to .42.

Partialling out M.A. and C.A. from each of the five remaining variables, Marbles (1), Auditory (3), Boxes (4), Visual (5), and Toys (6), leaves the intercorrelation coefficients practically unchanged. Apparently the relationship between these variables is not due to the G factor of Spearman (general intelligence).

The preceding facts, therefore, justify the employment of the Spearman tetrad difference criterion in order to determine the presence of any general factor, other than G, extending throughout the situations. The results of the application of this technique seem to indicate the presence of a general factor, plus one or more group factors. By pooling the Marbles and Boxes which contain an element of challenge not present in the other stimuli, the influence of the overlapping elements was largely cancelled, leaving rather clear evidence for a common factor pervading the five situations.

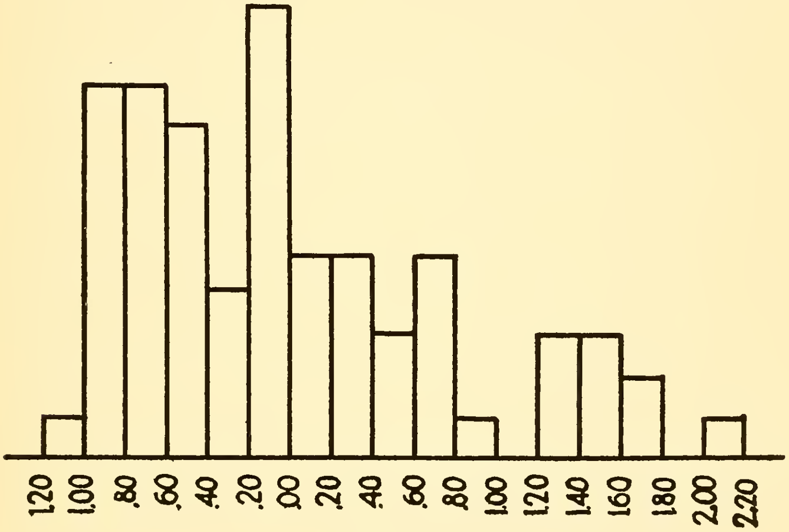

Figure 1.

Histogram showing the distribution of average sigma scores for Situations 1, 3, 4, and 6 for 70 subjects.
The base line is divided into units of .20 of a sigma.

In the absence of definite knowledge, this common factor was termed p, denoting the tendency of a child toward a certain consistency of behavior as measured by the duration of time spent with materials of a manipulative character.

It was further shown that although each test is a fairly representative measure of p, the Toys Situation (6) is most superior in this regard, correlating with p to the value of .86, even exceeding the pooled measures in this regard.

It is conceivable that a few simple toys such as those in the Auditory, Visual, and Toys Situations might be used under normal testing conditions to obtain an index of individual differences in children in respect to the trait described.

V. RESULTS (Continued)

Qualitative Differences

It was of interest to analyze the results somewhat further to ascertain what differences, if any, there might be between the different age groups, and also to determine the influence of sex and socio-economic factors.

The subjects were divided into three groups on the basis of age. Tables IX and X give the means of the time scores, S.D.'s of the distributions, the difference between the means, the standard deviations of the difference and the index of reliability for the two-, three-, and four-year-olds respectively.

In order to be highly reliable the difference in the means should be three times the standard deviation of the difference. In no case does the index of reliability (difference of means ÷ standard deviation of difference) show this result. In the case of the Marbles and Key Situations the differences between the scores of two- and four-year-olds are of some significance for Marbles and Key, the chances being 95 out of 100, and 82 out of 100, respectively, that the difference represented is a real one. In the three- and four-year-old group the chances are 82 out of 100 that the Key scores are significantly different. This difference is clearly shown in Table IX in the progressively increasing means.

The older children apparently find the Visual toy (5) less engrossing than do the younger children (cf. Table IX). The chances are 98 out of 100 that these differences are significant between the two- and four-year-olds; and 96 out of 100 that they are significant between the three- and four-year-olds. All the other results are probably negligible in view of the small number of cases in each group.

Sex Differences

Few sex differences were revealed in the scores of the separate situations.

TABLE IX

MEAN TIME SCORES WITH S.D.'S FOR THE 2, 3, AND 4 YEAR OLD GROUPS

Age in Months	*N**	*Marbles (1) Mean*	*Marbles (1) S.D.*	*Key (2) Mean*	*Key (2) S.D.*	*Auditory (3) Mean*	*Auditory (3) S.D.*	*Boxes (4) Mean*	*Boxes (4) S.D.*	*Visual (5) Mean*	*Visual (5) S.D.*	*Toys (6) Mean*	*Toys (6) S.D.*
23-35	24	17.5	9.75	2.66	1.97	14.9	5.6	18.0	8.79	10.22	4.6	20.1	7.96
36-47	32	20.1	14.15	3.15	3.17	16.2	9.77	18.1	10.52	9.9	5.83	21.5	13.04
48-61	14	23.7	11.44	4.54	4.15	16.4	10.02	17.3	9.52	7.32	3.21	19.7	8.02

* In test 2, age group 23-35 N = 22.
In test 4, N equals respectively 21, 28, 13.

TABLE X

DIFFERENCES IN THE MEANS, S.D. OF DIFFERENCE, AND INDEX OF RELIABILITY FOR AGE GROUPS

Test	*2 and 3 year olds* Diff. M & M	*2 and 3 year olds* S.D. Diff.	*2 and 3 year olds* Index of Reliability	*2 and 4 year olds* Diff. M & M	*2 and 4 year olds* S.D. Diff.	*2 and 4 year olds* Index of Reliability	*3 and 4 year olds* Diff. M & M	*3 and 4 year olds* S.D. Diff.	*3 and 4 year olds* Index of Reliability
Marbles	2.60	3.20	0.81	6.20	3.65	1.69	3.60	3.95	0.91
Key	0.49	0.70	0.70	1.88	1.17	1.60	1.39	1.23	1.13
Auditory	1.30	2.07	0.63	1.50	2.92	0.51	0.20	3.19	0.06
Boxes	0.10	2.58	0.04	0.70	3.10	0.23	0.80	3.15	0.25
Visual	0.32	1.49	0.21	2.90	1.34	2.16	2.58	1.41	1.83
Toys	1.40	2.82	0.49	0.40	2.69	0.15	1.80	3.15	0.57

Table XI shows these results for the 39 boys and 31 girls who served as subjects.

TABLE XI

Showing Sex Differences in Means and Reliability of these Differences

f = 39 m = 31	*Means of Girls*	*Means of Boys*	*Diff. in Means*	*S.D. Diff.*	*Index of Reliability*
C.A.	40.54	38.65	1.89	1.96	0.96
Marbles	21.44	17.97	3.47	2.82	1.23
Key	3.69	2.75	0.94	0.77	1.22
Auditory	14.50	17.41	2.91	2.09	1.39
Boxes	20.23	14.96	5.27	2.15	2.45
Visual	8.05	10.38	2.33	1.22	1.91
Toys	19.89	21.67	1.78	2.56	0.70

There is a tendency for the girls to prefer the Marbles and Boxes, while the boys' choice seems to lie in the direction of the Auditory and Visual stimuli. It is interesting to note in passing that the former were more aesthetic in character, both the Marbles and the Nest of Boxes involving the element of color, while the Auditory and Visual stimuli were of a more mechanical nature. The preference for the Boxes (5) is so decidedly marked in the girls, the chances being 99 out of 100, that it is a significant difference, that one is tempted to speculate as to whether this is an early flowering of the 'housewifely' instinct in girls, or merely an example of the superior susceptibility of girls to color.

To further study sex differences, the average composite score* was noted for males and females, and the difference of the two means in terms of the S.D. of the difference was estimated. Table XII gives the result:

TABLE XII

Av. Composite Score-Males	*Av. Composite Score-Females*	*Diff.*	*S.D. Diff.*	*Index of Reliability*	*N*
398.57	389.70	8.87	4.10	2.12	m = 28 f = 33

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* Approximate weightings were assigned as follows: the average beta weight given in each of the six combinations of each variable correlated against the sum of the other variables was divided by the S.D. of the variable, each subject's score being weighted by constants—obtained from these quotients. By this method the tests received the following weight: 1 x 4; 2 x 5; 3 x 6; 4 x 3; 5 x 5.5; 6 x 5.

The difference indicates that males have a tendency to perseverate slightly longer than females, at least with manipulative material of this sort. The difference is not completely reliable, since the index of reliability would have to be at least three in this case. The findings are interesting, however, in view of the fact that Spearman[27] maintains that the male sex shows a greater tendency to perseveration.

Table XIII gives similar facts for Groups A and B. Here we see no highly significant differences. There is a slight tendency for Group A to stay longer with the Toys Situation (6). A priori the contrary might have been expected, since to this group toys are, presumably, less of a novelty than in the case of Group B. From a subjective point of view, the settlement children seemed to E much more thrilled over the situations—in fact, in many cases, it was difficult to keep them from the experimental room until their turn arrived. This initial eagerness did not seem to have any bearing on the result, however, nor, so far as E could judge, did the mood, which accompanied the situation, in any degree forecast the amount of time which would be spent in the situation.

TABLE XIII

N = 49 *(Group A)* N = 21 *(Group B)*	*Means of Group A*	*Means of Group B*	*Diff. in Means*	*S.D. Diff.*	*Index of Reliability*
C.A.	38.92	41.52	2.60	2.23	1.17
Marbles	19.38	20.07	0.24	3.00	0.08
Key	3.09	3.75	0.65	0.96	0.68
Auditory	15.26	17.03	1.77	2.37	0.75
Boxes	17.71	18.33	0.62	2.57	0.24
Visual	9.34	9.76	0.42	1.36	0.31
Toys	21.75	18.17	3.58	2.55	1.41

Sensory Fields

It was indicated above that the attempt was made to present stimuli in several sensory fields. Situations 3, 5, and 6, Auditory, Visual, and Kinesthetic, respectively, were differentiated to some degree in this respect. Actually the manipulative drive was present in all the situations, so that we are probably not justified in drawing any very definite conclusions. Insofar as there were differences between the stimuli, the intercorrelations seem to show some evidence for perseverative tendencies to correlate fairly well in different sensory fields.

Summary

The subjects were divided into three groups according to chronological age. No striking differences in means for the different situations were found for the two-, three-, and four-year-olds, except possibly in the case of the Marbles (1), and Key (2), occupations at which the older children tended to continue longer. The reverse was true in the case of the Visual stimulus (5), which apparently held more appeal for the younger children. In Situations 3, 4, and 6 the differences were negligible. In no case was the difference as great as three times the S.D. of difference.

Small sex differences were apparent but except in the case of the Boxes (4), these differences were not highly reliable. In general it may be said that the girls favored the Marbles, Key, and Boxes Situations, while the boys preferred the more mechanical things.

There were no significant differences between Groups A and B, except possibly in the case of the Toys where the mean was slightly lower for the Settlement Group. This may be due to the fact that the children in this group were somewhat older than those in Group A.

In general, it may be said that the scores were little influenced by sex, age, or economic status.*

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* In a study of involuntary attention under somewhat different conditions in which 36 children between the ages of two years two months and six years served as subjects, Bertrand[5a] reaches rather different conclusions. He finds that the mean time spent with favorite material increases progressively with age, and that girls attend longer than boys. He believes that individual consistency of performance is low. Statistical verification of these hypotheses, beyond the means and raw scores, are not quoted.

VI. METHOD OF VALIDATION

In an attempt to check on the validity of the experiment a 'habit questionnaire' was used in place of the ordinary trait-rating scheme. "Habits are elements of experience and have a certain degree of reality—we are never sure of the reality or existence of traits," says Symonds.[30] A survey was made of the items included in the Andrus[2] Inventory of the Habits of Young Children. Those items which it was believed would objectify and throw into relief the factor of perseveration as it had been conceived for purposes of the experiment were used as a nucleus of a habit questionnaire. Certain items were changed slightly and a few were added, making a total of 47 questions. Each question was followed by the words "often, seldom, never" and the rater was required to draw a line under the word that in her judgment best answered the question.

Each of the subjects in the college group was rated by three persons, two nursery school teachers and a parent, usually the mother.*

Scoring

"Often, seldom, never" were respectively scored 2, 1, 0. The sum total of the values of these underlined words was the "perseverative" score. The maximum possible score for perseveration was 2 × 47 items or 94. Following are the intercorrelations of the ratings.

TABLE XIV

Correlation	*r*	*P.E.*
Rating of Teacher 1 and Teacher 2	.43	±.08
Rating of Teacher 1 and Parent	.10	±.10
Rating of Teacher 2 and Parent	.21	±.09
Rating of Teacher 1 with Average of Ratings	.80	±.03
Rating of Teacher 2 with Average of Ratings	.75	±.04
Rating of Parent with Average of Ratings	.52	±.07

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* Five cases only were rated by fathers. The following teachers rated the children:

T_1 = Walker, Brugger, Gildersleeve. Wagoner.

T_2 = Hankins, Schafer, Mumford, Farland, Burnett, Yerkes, Merritt, Smith, Tiebot, McColgar.

Parents' ratings showed a negligible amount of correlation with ratings of the Nursery School teachers. Parents' ratings are probably of doubtful value since they have no standards with which to compare their children, while teachers have a basis of comparison not only in the present group but in the numbers of children of the same age levels whom they have handled in other groups.

The ratings of Teacher 1 correlated with those of Teacher 2 to the amount of .43. This correlation would probably have been higher if the number of raters who assigned the second ratings could have been reduced.

Teacher 1's ratings showed the best single correlation with the average of the three ratings (.80 ± .03), indicating that this is the most valid criterion of the three.

Reliability of the Questionnaire

The reliability of the rating scheme itself was sought by correlating the scores of the odds against the scores of the evens for 155 individual ratings.

TABLE XV

N = 155

Correlation	*r*	*P.E.*
Odd items with even items of habit questionnaire	.78	±.02

Applying the Spearman-Brown Prophecy formula results in a reliability for the total questionnaire of .89. Thus we see that the instrument has a sufficiently high reliability to warrant its use. Parents and teachers tend apparently to rate the child with some degree of consistency in either half of the questionnaire.

Validity of the Experiment

Validity of the experiment was measured by correlating the composite score received in the experimental situations against the average of the three ratings. The resulting coefficient is .40, thus showing that there is at least some correspondence between observers' estimates of the tendency of children to continue in a given behavior 'set' and the same factor as measured by experimental situations.

Summary

A habit questionnaire composed mainly of items taken from the Andrus Inventory gave a validity coefficient of .40. The reliability of the questionnaire as measured by the correlation between chance halves was .78. By application of the Spearman-Brown Prophecy formula, the coefficient was raised to .89, indicating satisfactory reliability.

RATING SHEET

(Adapted from An Inventory of Habits of Children from 2-5 Years by Andrus)

Name of Child
Name of Rater Relationship to Child
How long have you observed this child?

Some people enjoy repeating experiences, that is, doing the same things over and over again; others prefer a great deal of variety and are easily bored by monotonous repetition. Industry needs both types of individuals. Children, like adults, show these differences in disposition. In the following situations the attempt is made to discover such individual differences in children. Will you please cooperate by answering the questions to the best of your ability?

Directions:

The questions are followed by the words "often," "seldom," "never." Draw a line under the one that in your judgment best answers the question.

Does the child

1. Make more than one effort to accomplish a task? Often Seldom Never
2. Finish an activity begun? Often Seldom Never
3. Ask repeatedly for something if no attention is paid to his request? Often Seldom Never
4. Recur to a subject several times, although this matter has been settled by the parent or teacher? Often Seldom Never
5. Seek some roundabout way of getting what he wants when refused directly? Often Seldom Never
6. Stay on toilet after finished? Often Seldom Never
7. Cry for some time when once started? Often Seldom Never
8. Laugh for some time when once started? Often Seldom Never
9. Show annoyance when interrupted by teacher? Often Seldom Never
10. Lie awake a long while after being put to bed? Often Seldom Never
11. Hold food in mouth for some time before swallowing? Often Seldom Never
12. Exhibit mannerism, such as twisting his hair or swinging his foot? Often Seldom Never
13. Stay awake at nap time? Often Seldom Never

14. Have any set habit of going to sleep; e.g., hold a blanket, take a special plaything, etc.? Often Seldom Never
15. Wake up slowly? Often Seldom Never
16. Lie abed willingly after waking up? Often Seldom Never
17. Attend to one thing consecutively for more than 5 minutes? Often Seldom Never
18. Attend to one thing consecutively for more than 10 minutes? Often Seldom Never
19. Attend to one thing consecutively for more than 20 minutes? Often Seldom Never
20. Evidence interest in one or two things rather than a variety of things? Often Seldom Never
21. Evidence little interest in new or unusual things in a situation? Often Seldom Never
22. Prefer to do things in the same way each time? Often Seldom Never
23. Show a continuity in interest from day to day, e.g., play with the same toy every day? Often Seldom Never
24. Show hesitation in starting a new activity? Often Seldom Never
25. Watch animals, birds, or trains for more than a minute at a time? Often Seldom Never
26. Look out of the window for more than a minute at a time? Often Seldom Never
27. Watch other children play without offering to join in? Often Seldom Never
28. If interrupted, return to the original activity? Often Seldom Never
29. Attempt to dress or undress himself without asking for help? Often Seldom Never
30. Like to help with routine jobs such as clearing off the table? Often Seldom Never
31. Tend to repeat an activity many times in succession, as walking up and down stairs, going down the slide, walking up and down the inclined board, swinging, seesawing, etc.? Often Seldom Never
32. Play with one toy for long periods at a time? Often Seldom Never
33. Enjoy activities involving repetition, such as putting pegs in the pegboard, stringing beads, weaving, etc.? Often Seldom Never
34. Sit quietly for several minutes at a time without playing? Often Seldom Never
35. Stand quietly without playing for some time? Often Seldom Never
36. Move toward a goal slowly? Often Seldom Never
37. Speak in a slow or hesitating manner? Often Seldom Never
38. Prefer to play with one child at a time? Often Seldom Never
39. Play with one particular child? Often Seldom Never
40. Share materials or playthings with one particular child? Often Seldom Never
41. Make new friends slowly? Often Seldom Never

42. Make few advances toward a new child? Often Seldom Never
43. Contribute few or no suggestions in group discussions? Often Seldom Never
44. Talk most when alone or with one person? Often Seldom Never
45. Await his turn patiently? Often Seldom Never
46. Prefer solitary games or activities to group participation? Often Seldom Never
47. Seem to have difficulty in entering into group activities? Often Seldom Never

VII. CONCLUSIONS

The assembled evidence gathered in the course of this study converges in such a fashion as to indicate the presence of a common factor extending throughout occupations of young children which involve manipulative materials of a simple repetitive sort.

That this trait is not explicable on the grounds either of chronological or mental ages has been amply demonstrated in several ways, first by means of the raw intercorrelations of the experimental situations with C.A. and M.A.; secondly, by applying the partial correlation technique, whereby M.A. and C.A. are held constant; and finally, by showing that differences between the means of the separate tests at the various age levels are of no practical significance.

The consistency of performance indicated by the intercorrelations between the tests was further shown to be reducible to a common factor plus small group factors. In the absence of positive information as to the nature of this general factor it has been termed a 'perseverative tendency' (p). The trait appears to vary conspicuously from one individual to another.

As a corollary to the above supposition, it should theoretically become possible to test individuals in respect to the degree to which the trait is possessed. The implications of such knowledge for a better understanding of child nature and of human nature in general are obvious. It is quite within the realm of possibility that much of the behavior at present ascribed to 'stupidity,' 'disobedience,' 'defiance,' 'stubbornness,' 'lack of cooperativeness,' might better be explained on the grounds of the presence to a high degree of a 'perseverating' tendency. The trait should also be studied in relation to vocational pursuits.

A second obvious inference from the study is the necessity of showing that this trait is relatively constant for individuals throughout life, and hence partakes of the nature of an 'innate' characteristic analogous to 'general intelligence.'

The third mode of procedure suggested by the study is the determination of the trait in responses other than those involving manipulative materials. In the absence of such evidence, we cannot be sure to what extent 'perseverative tendency' is coterminous with 'interest in manipulation.' The conditions of this study merely allow us to affirm with some degree of assurance that there is evidence of a common factor pervading situations of a simple repetitive nature involving concrete materials.

VIII. SUMMARY

Seventy children between the ages of two and five were subjected to six experimental situations. Of these children, 49 (referred to as Group A) were in nursery schools affiliated with institutions of higher learning, while 21 (referred to as Group B) were in settlement nursery schools. With the exception of Situation 2, which probably involved deliberate persistence, the situations were designed to elicit evidence for the existence of a general, or basic factor of 'perseveration.' 'Perseverative tendency' as defined for purposes of this study was 'the tendency of an individual to continue in a given behavior set when no end goal was set up.'

The materials presented were of a simple repetitive character. The first situation consisted simply in dropping marbles through a hole into a cardboard box; Situation 2 involved the attempt to insert a 'doctored' key into a lock; in Situation 3, four auditory stimuli were presented successively, an electric bell, a 'whistle' doll, a handbell, and a snapper. A nest of boxes with covers comprised the material for Situation 4. Situation 5 consisted of a small toy machine which made colored sparks or 'stars.' In Situation 6 three toys (consisting of a racetrack toy, airplanes, and a see-saw, all of which 'performed') were clamped to the sides of a table.

The criterion of the 'perseverative' impulse was the time spent in spontaneously manipulating the material, during which there was no pause as long as 60 seconds. The scores, which were kept in terms of time, showed a wide range within the situations themselves.

Omitting the Key Situation (2), intercorrelations between the scores ranged from +.18 to +.61 with an average intercorrelation of .42. Correlations between the separate tests and chronological age were either small or negligible. When C.A. was correlated against the composite, r rose to .41, partialling out M.A., however, the correlation became insignificant (.007).

The correlations of M.A. with the separate tests ranged from —.19 to +.26 with an average correlation of .06. With the composite, however, the correlation is .48. Partialling out C.A., r = .28. The tendency of a child to maintain a given behavior set seems, therefore, to show a slight increase with maturity of mental function, as measured by these operations.

Each of the testing situations correlated in a fairly satisfactory manner with a composite made up of the other five tests. The four best tests judged by this criterion were divided into two teams which were then correlated against each other. The coefficient of reliabiilty thus obtained, .71, was raised to .82 when the Spearman-Brown prediction formula was applied.

The correlation with the weight-height index $\frac{W}{H}$ was .31. This relationship may be one of maturity rather than an evidence of a relation between body build and perseverative tendencies.

To further determine the influence of C.A. and M.A. upon the scores, both of these variables were partialled out. The correlations resulting remained practically unchanged, pointing to the supposition that factors other than G (general intelligence) and chronological age were involved. In support of this hypothesis Spearman's criterion of tetrad differences was applied to the data. The results seemed to indicate the presence of a common factor pervading the situations plus certain small group factors.

This general factor was hypothetically termed the 'perseverative tendency' (p). By the application of Spearman's formula 4 it was found that while all of the situations measured p to a considerable extent, the Toys Situation (6) was the best measure, correlating with p to the extent of .86 which was in excess of the value of the battery as a whole in this regard.

Correlation with Merrill-Palmer M.A. was significantly high ($r = .58$). This may indicate that the child's interest in manipulative material of this sort is to a certain degree commensurate with his skill in manipulating it.

Qualitative investigations of age, sex, and socio-economic status failed to indicate any reliable variations due to these factors.

There was a slight difference in the Marbles and Key (1 and 2) Situations in favor of the older children and the reverse was true in the case of the Visual stimulus (5).

Boys on the whole exceeded girls slightly in the preseverative scores. This difference may, however, be due to the nature of the materials presented. In the individual tests small sex differences were apparent, but except in the case of the Boxes (4) they were not highly reliable. In general it appeared that the girls favored the Marbles, Key and Boxes (1, 2, 4), while the boys preferred the more mechanical things, the Auditory stimuli, Star Machine, and Toys (3, 5, 6).

No significant differences were found between the means of Groups A and B. The trait measured in these situations did not seem to be affected by socio-economic background to any extent. Children from less favored environments and those from homes where presumably there was a greater variety of toys and play materials spent an equal amount of time in manipulation of the material presented.

In an attempt to validate the experiment a "habit questionnaire" was prepared and submitted to three persons who had had a considerable opportunity to observe the children. In each case the raters consisted of two teachers and a parent (uually the mother). The habit questionnaire correlated .40 against the combined situations. This result shows only a fair degree of correspondence between the length of time a child continues in a situation or "set" and the judgment of observers concerning his tendency in this direction.

REFERENCES

1. Allen, W. S. A Study in Latin Prognosis. T.C. Contr. Educ. No. 135, Columbia Univ., 1923.
2. Andrus, R. An Inventory of the Habits of Children from Two to Five Years of Age. Columbia Univ., 1927.
3. Baldwin, B. T. and Stecher, L. Psychology of the Pre-school Child. New York, D. Appleton Co., 1924.
4. Baldwin, B. T. The Physical Growth of Children from Birth to Maturity. Univ. Iowa St. in Child Welfare, 1:1.
5. Bernstein, E. Quickness and Intelligence. Brit.J.Psychol. Monog. Supp., 1924, 7.

5a. Bertrand, F. L. Contribution a l'Etude Psychogenetique de l'Attention. L'Annee Psychologique, 1925, 26, 155-159.

6. Bridges, K. M. B. Occupational Interests of Three-Year-Old Children. Ped.Sem., 1927, 2, 415-423.
7. Bühler, K. Die geistige entwicklung des kindes. Jena, Fischer, 1924.
8. Claparède, E. Psychologie de l'enfant et pedagogie expérimentale. Genève, Kundig, 1926.
9. Downey, J. E. The Will-Temperament and its Testing. Yonkers, N. Y., World Book Co., 1923.
10. Foster, W. S. On the Perseverative Tendency. Amer.J.Psychol., 1914, 25, 393-426.
11. Garrett, H. E. Statistics in Psychology and Education. New York, Longmans Green and Co., 1926.
12. Garfiel, E. Measurement of Motor Ability. Arch. Psychol., 1923, No. 62.
13. Garnett, J. C. M. General Ability, Cleverness and Purpose. Brit. J.Psychol., 1919, 9, 345-366.
14. Gesell, A. Mental Growth of the Pre-school Child. New York, Macmillan Co., 1926.
15. Gesell, A. Infancy and Human Growth. New York, Macmillan Co., 1928.
16. Goodenough, F. L. The Kuhlmann-Binet Tests for Children of Pre-school Age. Minn., The Univ. of Minnesota Press, 1928.
17. Heymans, G. and Brugmans, H. J. T. W. Intelligenzprufungen mit Studierenden. Zeit. für Ang.Psychol., 1913, 7, 323-326.
18. Jersild, A. T. Mental Set and Shift. Arch.Psychol., 1927, No. 89.
19. Jones, L. W. Perseveration. Rep.Brit.Ass.Adv.Sci., 1915, p. 684.
20. Kelley, T. L. Crossroads in the Mind of Man. Calif., Univ. of California Press, 1928.
21. Koffka, K. The Growth of the Mind. (Tr. by R. M. Ogden.) New York, Harcourt, Brace and Co., 1924.
22. Kuhlmann, F. A Handbook of Mental Tests. Baltimore, Warwick and York, Inc., 1922.
23. Lankes, W. Perseveration. Brit.J.Psychol., 1917, 7, 387-419.
24. Marston, L. R. The Emotions of Young Children. Univ. Iowa St. in Child Welfare, 1925, 3:3.
25. Müller, G. E. and Pilzecher, A. Experimentelle Beiträge sur Lehre vom Gedächtniss. Zeit. f. Psychol. 1, 1900, 58 ff.
26. Reynolds, M. M. Negativism of Pre-school Children. T. C. Contr. Educ. No. 288, 1928.
27. Spearman, C. The Abilities of Man, Their Nature and Measurement. New York, Macmillan Co., 1927.
28. Stern, W. and Stern, C. Psychology of Early Childhood (Tr. by Barwell). New York, Henry Holt and Co., 1924.
29. Stutsman, B. Performance Tests for Children of Pre-school Age. Genet.Psychol.Monog., 1926, 1:1.

30. Symonds, P. The Present Status of Character Measurements. J.Educ.Psychol., 1924. 15, p. 486.
31. Terman, L. M. The Measurement of Intelligence. Boston, Houghton Mifflin Co., 1916.
32. Toops, H. A. Eliminating Pitfalls in Solving Correlations. J. Exper.Psychol., 1921, 4, 434-446.
33. Toops, H. A. Tests for Vocational Guidance of Children Thirteen to Sixteen. T.C. Contr. Educ. No. 136, 1923.
34. Twenty-eighth Year Book, National Society for the Study of Education.
35. Wagoner, L. C. The Constructive Ability of Young Children. Univ. Iowa St. in Child Welfare, 1925, 3:2.
36. Walker, H. M. A Historical Survey of Certain Topics Relating to Educational Statistics. Columbia Univ. Dissertations, 1927, Dept. of Philosophy.
37. Watson, J. B. Experimental Studies on the Growth of the Emotions. Ped.Sem., 1926, 33, 327-348.
38. Watson, J. B. Psychological Care of Infant and Child. New York, W. W. Norton and Co., 1928.
39. Watson, J. B. The Ways of Behaviorism. New York, Harper and Bros., 1928.
40. Watson, J. B. and Rayner, R. Conditioned Emotional Reactions. J.Exper.Psychol., 1920, 3, 1-14.
41. Webb, E. Character and Intelligence. Brit.J.Psychol. Monog. Supp., 1915, 1:3.
42. Wells, F. L. Mental Tests in Clinical Practice. Yonkers, N. Y., World Book Co., 1927.
43. Wiersma, E. Die Sekundärfunktion bei Psychosen. J.Psych. u. Neurol., 1906, 8:1.
44. Woodworth, R. S. Combining the Results of Several Tests: A Study in Statistical Method. Psychol.Rev., 1912, 19, 97-123.
45. Woolley, H. T. and Cleveland, E. Performance Tests of 3, 4, and 5 Year Children. J.Exper.Psychol., 1923, 6:1.

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